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Children's Age, Intelligence and Sex as Variables Mediating Reactions To TV Commercials: Repetition and Content Complexity Implications for Advertisers

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ABSTRACT

To learn if differences in age, intelligence, and sex account for differences in children's recall of TV commercials and in the degree of insistence with which they request that the advertised product be purchased, 54 gifted, 71 normal and 53 educable mentally retarded children of both sexes (7-13 years) were questioned after viewing commercials for breakfast cereals. Analyses of variance reveal that both age and intelligence were significantly related to recall while only intelligence was significantly related to degree of insistence. Sex differences were not significant for either recall or dgree of insistence nor were any of the possible 2 way and 3 way interaction terms. The nature of the joint covariance between the outcomes (recall and degree of insistence) and the children's characteristics (age, sex, and intelligence) was explored via canonical analysis, and implications for advertisers in terms of repetition and message complexity are discussed.

IR005-748

Children's Age, Intelligence and Sex as Variables Mediating Reactions To TV Commercials: Repetition and Content Complexity Implications for Advertisers

The importance of the child market is evidenced by the facts that children are active purchasers (or purchase influencers) of many products, and that their numbers are large and growing. Furthermore, they learn their basic consumption patterns and attitudes toward promotional efforts at this stage in their lives. A new and important reason for marketers to focus attention on research into children's responses to promotion is the mounting attack on advertising directed toward children. Pressure has increased in the early 1970's, and Efron (1973) has summarized some of it. Because of the special status enjoyed by children in society, advertising directed toward them has become an emotional issue. It is suggested that children's advertisers use this defensive strategy to counteract emotional-based pressure: conduct research into children's learning processess--how children learn about, remember, and use mass-communicated information about products. Such research has the potential of producing factual information, the inclusion of which would materially improve the hitherto largely histrionic public debate on the issue. This article presents the results of research on TV commercials as a broadly-defined children's learning tool.

TV programming and commercials may both be effective learning tools. Popular TV shows have been used in Philadelphia to help children to read. Children watched a program in class while following a written script. Preliminary reports indicate effectiveness. (Corpus Christi Caller, 1973) Louisville's River Region Mental Health/Mental Retardation Board is currently using public service ads to promote emotional stability by educating people to cope with daily emotional problems or to seek help in the

early stages of emotional distress although results are still incomplete (Advertising Age, 1973). Sesame Street apparently has been successful in helping pre-school children to read. It borrows many techniques from TV commercials to use in its program content by repeating several short one-minute messages in each episode. Paid-for TV ads are also short and repeated. Some of these borrowed techniques include: (1) short messages, (2) continual repetiton or distributed practice, (3) realistically executed fantasy, (4) emphasis on motion rather than on static pictures or verbiage, (5) scenes demonstrating how reward/enjoyment results from using the "product," and (6) scenes emphasizing the "product" itself. Wells (1965, p. 2) reports that children's TV ads which include points (3) through (6) achieve advertisers' goals better than ads without.

The preceding suggests six important questions:

1. Do TV ads facilitate the learning of information by children?
2. Is there a difference in the amount of information learned by children of different intelligence levels?
3. Is there a difference in the amount of information learned by children of different ages?
4. Is there a difference in the amount of information learned by children of different sexes?
5. Which factor is most important in learning this kind of information: age, sex, or intelligence?
6. How can TV ads be manipulated (simplified, made more complex, repeated more or less frequently, etc.) in order to improve learning of information by children of different ages, sex, and levels of intelligence?

These same questions can be applied to the creation of a child's desire for for a product by TV ads.

Although it is dangerous to assume a hierarchy of effects (Palda, 1966), Campbell (1965) and Hendon (1973b, p. 43) have pointed out that several outcomes of advertising can be measured validly at the same time, depending on advertisers' goals. In this paper, only two outcomes are measured--learning

of TV cereal commercial information and desire for cereal (the advertised product) by children. Thus, 12 questions are posited, dealing with intelligence, age, sex (three independent variables), learning, and desire (two dependent variables). This paper attempts to ascertain whether any or all of the independent variables is a source of variation in learning and desire, as well as their relative importance.

THEORY AND HYPOTHESES

Intelligence

Three distinguishable levels of intelligence are "normal," "gifted," and "educable mentally retarded" (EMR). Terman and Merrill (1960, p. 18) report a normal child's I.Q. is in the 90-110 range. Kirk's (1972a, p. 113) criterion of "giftedness" is an I.Q. of 115 and above on the Stanford-Binet intelligence test, although he subdivided this group into superior, very superior, and gifted. He (1972a, p. 164) confines the EMR to an I.Q. range of 50-55 to 75-79. Because of subnormal mental development, the EMR child can only progress at three levels--educability in academic subjects at a minimum level, educability in social adjustment to a point where he can get along independently in the community, and minimal occupational adequacy so he can support himself partially or totally as an adult. The EMR is compared with the slow learner (I.Q. 80-90), the trainable mentally retarded (I.Q. 30-35 to 50-55), and the totally dependent or profoundly mentally retarded (I.Q. below 25-30).

Kolstoe (1972, pp. 91-106) reports four aspects of learning are important to EMR'S: (1) memory, (2) generalization, (3) incidental learning, and (4) social learning. The last is not pertinent here. In regard to memory,

Zeaman and House (1963) and Ellis (1963) found that once mentally retarded children "catch on" to what is required, they learn as rapidly and as skillfully as normal children, especially in the long-run. However, retardates waste more time in random, trial-and-error efforts than normals in initial learning stages. Stedman (1963), Spitz (1963), and Madsen and Connor (1968) found that the retarded child uses less abstract methods for clustering, categorizing, and information reduction than the normal child. Das (1972) found that normal and retarded children use distinct modes of coding information. However, when category labels are readily available and spoon-fed to them, there is no difference in learning rate, in efficiency in reducing information, in information storage, and in memory. Kolstoe (1972, p. 100) reports generalization (sometimes called transfer or learning to learn) occurs either by rote or by using principles. Orton, McKay, and Rainey (1964) found that retarded children learn better by rote. An example of incidental learning is learning that one develops a severe cold each time one walks in cold rainstorms wearing light clothing. Goldstein and Kas (1961), Oliver (1963), Singer (1964), and Williams (1968) found that the retarded are not inferior to normal children in incidental learning. In tasks more complicated than incidental learning, however, normal children outperform retardates rather consistently, and Das (1972) reports that normal children's performance on a series of cognitive tasks was superior to the retarded in each task.

What kind of task is the learning of information contained in a TV ad? Ward (1972, p. 42) suggests this kind of learning is complicated enough to use four levels of recall. More complicated memory measures are used to measure children's learning of instructional media (lectures and textbooks), since the content of information conveyed here is more complicated than that

conveyed by TV ads. It is felt that TV ads are relatively simple and unsophisticated compared to normative instructional media. The relative simplicity of TV ads is the first of four reasons for adopting this study's first null hypothesis concerning intelligence and learning:

H_1: There is no significant difference between EMR, normal and gifted children in their response to TV ads aimed at children. "Response" is defined operationally in two ways: (1) memory of content of TV ads and (2) the degree to which the children insist that their mother purchase the product advertised, or degree of insistence (DI).

Other reasons for adopting H_1 are: (2) Most TV ads are repeated often over time, and EMR's learn labeled material as rapidly and as skillfully as normals after the initial slow "catching on" period for the retardates, especially in the long-run. Furthermore, labeling occurs in TV ads, since they stress product identification. (3) Both groups perform equally well in incidental learning. It is felt that TV ads are incidental and not substantial to the majority of Americans. Support for this assertion can be found in the work of Greyser (1965, pp. 11-15), who reports advertising is not important to the majority of Americans. Also Ward (1972, p. 39) reports that only seven percent of all children in his sample exhibit high awareness of the purposes of TV ads--to sell goods and services. (4) Retarded children learn better by rote than by learning principles, and TV ads stress rote learning more than learning by principles, in light of the relative scarcity of demonstration (principles) and the relatively large number of slogans and jingles (rote) in children's TV ads.

"Gifted" children, operationally defined here as those whose I.Q.'s are 115 and above, consistently exhibit superiority to normal children in memory, generalization, and incidental learning. Kirk (1972a, pp. 151-154) lists ten characteristics of gifted children, five of which have to do with the null hypothesis above. Two of the ten characteristics suggest that gifted children learn at the same rate as normals, three suggest that gifteds learn faster than normals, and five suggest no relationship. While the gifted child's superior reasoning ability, wide range of interests and intense drive in intellectual pursuits, and observance suggests a faster learning rate, two factors suggest the two learn at the same rate: (1) The gifted child's insatiable curiosity makes him want to know why. Gifteds may be frustrated by the relative lack of "why"-type information in commercials, leading to cognitive dissonance and disremembering. (2) The gifted child requires less repetitions to learn. In this respect, learning usually increases with repetition; for some knowledge (ABC's, etc.), forgetting does not occur. However, Grass (1968) reports a satiation effect after approximately 15 identical TV ads are seen, after which adult viewers actually disremember information from the commercial. Up to 15 viewings, the memory curve has a continuous positive slope. Similar findings concerning semantic satiation and/or TV ads are reported by Hovland, Janis, and Kelley (1953, p. 249), Schwerin (1960a, p. 9, 1960b, p. 1), and Jakobovits (1967). The satiation effect may not have occurred while learning ABC's, for this learning is important to school children. It may be that learning about ads is not nearly as important to children, as Greyser (1965, pp. 11-15) suggested. Therefore, if gifted and normal children are exposed to the same ad the same number of times, the gifteds may reach the satiation point of disremem-

bering before the normals do.

Age

Age and intelligence are not independent. Many studies have indicated a positive correlation between the two. Piaget's (1963) stages of intellectual development theory states that children develop intelligently through five phases from birth through 11-15 years. But while something has to account for variations in I.Q. with age, conflicting evidence is reported in the literature: Hofstaetter (1954) performed an 18-year longitudinal study of I.Q. scores and concluded that the major factor measured before age two was "sensorimotor alertness;" "persistence" between two and four years; and "manipulation of symbols" beyond four years. Meyers and Dingman (1960) concluded that there are seven factors which can be isolated in the 4-6 year range. McNemar (1942) and Jones (1954) both factor-analyzed different items included at various age levels on the Stanford-Binet test; McNemar concluded that one factor explained a large part of the performance at each separate age but that the factor changes in nature over the age span, while Jones concluded there were several factors, which become more differentiated with age.

So far, the relationship between age and I.Q. and the relatively higher I.Q. of the average older child have been generalities. It is also necessary to theorize about the relationship of age to learning of information and desire. Ward, Levinson, and Wackman (1971) report that as chronological age increases, a decrease occurs in degree of insistence (DI) that parents purchase products advertised. Ward (1972, pp. 39, 42, 43) reports that as age increases, more children understand the purpose of commercials, the level of complexity of recall increases, and fewer children believe the

content of ads. Therefore, this study's second null hypothesis is:

H_2: There is no significant difference between younger and older children in their response to TV ads aimed at children.

Sex

Boys and girls show no demonstratable difference in overall intelligence (Mussen, Conger, and Kagan, 1969, p. 619). However, there are sex differences in the areas of greatest relative competence (Terman and Tyler, 1954). These differences become apparent only in adolescence (Elkind, 1961a, 1961b; and King, 1963). The later development of differences suggests that the sexes reflect differences in interest, rather than differential mental abilities, according to Elkind (1968) and Northway and Wigdor (1947). Therefore, this study's third null hypothesis is:

H_3: There is no significant difference between boys and girls in their response to TV ads aimed at children.

METHODOLOGY

An all-white sample of 54 gifted, 71 normal, and 53 EMR children (93 males, 85 females, 7-13 years) was selected on the basis of availability from first through sixth grade classes in the Muscogee County (Georgia) school system, as seen in Table 1. Only whites were selected to eliminate possible differences due to race and socio-cultural background (Kirk, 1972b),

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Insert Table 1 about here

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although Barry and Hansen (1973) and Hendon (1973a) found no differences between white and black children in their memory of TV ads. This study's operational definitions of intelligence follow those of Kirk (1972a, p. 164)

for EMR's; Terman and Merrill (1960, p. 18) for normals; and Kirk's (1972a, p. 113) criterion of "giftedness"--an I.Q. of 115 and above on the Stanford-Binet test--for gifteds. Although I.Q. scores for normal and gifted children were not available to the researchers from the school system, school officials placed the children in the three categories according to I.Q.'s. Since gifted children are first identified in the fourth grade in the school system, gifted children of 7 and 8 years were excluded.

Questions were asked of students at 10 of the 43 elementary schools in the district. An experienced interviewer, with training in special education, questioned the 178 children individually. The 29 questions dealt with the five most advertised cereals on the three local network affiliates on Saturdays, 8 a.m. to 2 p.m., Eastern time, from January through April, 1973. Local TV station logs were examined to obtain this data. Cereal was selected to eliminate product as a source of variation and because it was the most heavily-advertised category during the four-month period.

From self-reports, those who watched TV in the time period less than three hours during each of the previous two Saturday mornings were eliminated. Viewing time ranged from 3 to 4 hours, with 3.25 hours as the mean. Since it was impossible to control for amount of previous exposure to a given ad, no difference was assumed between the three populations with respect to exposure; each child was assumed to be equally likely to have viewed each ad for each of the five cereals. Each cereal was advertised approximately the same number of times during the four months, according to station logs. There was no significant difference in frequency of airing among any of the five. However, the content of the ads within each cereal may have been different.

Interviewing took place during a three-week period in May. To measure memory of the cereal ads, 11 questions were asked, including "Is Super Star a cereal?" (no), "What does Sugar Bear eat?" (Sugar Crisps), and "Did the Quangaroo lose his map?" (yes). Thus, yea-saying was eliminated. To measure DI, four questions were asked: "Did your mother buy cereal at the store lately?" "Did you tell her which one to buy?" "Does your mother buy the cereal you ask for?" "If yes, was it almost everytime, sometimes, or always?" The operational measure of Recall was the number of correctly-answered questions about the commercials; the measure of Insistence was the number of positive answers about the cereal purchases. Since the school district would not allow parent interviews, DI could not be verified through their responses.

Analysis of variance was used to test the significance of the relationship between each of the children's characteristics (age, sex and intelligence) which served as independent variables and the outcomes (recall and degree of insistence) which functioned as dependent variables. In addition, the joint covariance between children's characteristics and outcomes was explored in canonical analysis.

FINDINGS

Analysis of variance, using three independent variables (age, sex and intelligence) and recall score as the dependent variable reveals two significant main effects, age and intelligence. No significant differences in recall score between sexes were found, nor were any of the possible two-way and three-way interactions significant. A summary of this analysis can be found in Table 2. It is noted that the relationship between age and memory

is not linear, while the relationship between intelligence and memory is approximately linear, and in the expected direction.

Insert Table 2 about here

Using the degree of insistence as the dependent variable and the same three independent variables as before, only one significant main effect, that attributable to intelligence, was detected. In addition, none of the possible interactions displayed a significant relationship to the degree of insistence. This analysis of variance is summarized in Table 3. In this analysis, the EMR children were least insistent that the advertised cereal be purchased, followed by increasing levels of insistence for the normal and the gifted children.

Insert Table 3 about here

Canonical analysis of the children's characteristics variable and the outcomes variable was performed for the entire sample as well as for each of the three categorical intelligence-determined groups. Canonical analysis reveals that for the entire sample, the domains of characteristics and outcomes are significantly related. One significant root was extracted and the coefficients for the canonical variates reveal that intelligence, age and sex, in descending order of importance are the characteristics involved, and that intelligence is more important by a factor of eight than its nearest competitor (age) when importance is judged on the basis of the square of the coefficient. Recall is the most important variable in the outcomes domain, over four times more important than degree of insistence, again using squared

coefficients for the canonical variates. Table 4 contains a summary of this

Insert Table 4 about here

analysis.

On the basis of the analyses of variance, the first null hypothesis can be rejected for both recall and degree of insistence. It's alternative, that differences in intelligence are significantly related to differences in both recall and insistence, is supported. The second null hypothesis, that there is no significant relationship between age and the outcomes, can be rejected for recall but not for degree of insistence. Thus age exhibits a significant but rather complex relationship to memory, while it was not found to play a significant role in accounting for the variation in degree of insistence. Finally, the third hypothesis, that there is no significant difference between boys and girls with respect to the two outcomes could not be rejected.

IMPLICATIONS

This research suggests that children do learn from TV commercials although the comparative learning effects of TV and other instructional media is not directly addressed here. What they learn (recall of labeled product information) and how they use this information (degree of insistence that product be purchased) is not significantly influenced by sex. Age plays a significant role in what is learned, and it may be that the children in the 13 year group, whose mean recall score is almost a scale point lower than for 12 year olds, have matured to the point where the childlike associations and simple-minded themes of cereal advertising produce disremembering. One can easily

speculate that this group, while confronting the physical and emotional experiences of early adolescense, may become profoundly unconcerned with whether or not Quangaroo lost his map. Further research is indicated here, as it is in the puzzling deterioriation in recall for 9 year olds, when compared with the 8 and 10 year olds. However, age does not significantly account for variation in degree of insistence that the product be purchased.

In this study, the overwhelming influence on what is learned and how the learned information is used, is exerted by intelligence level. Gifted children recall greater levels of content in TV cereal commercials than do normal children, who in turn display greater levels of recall than do the EMR children. In addition, gifted children appear to employ the messages learned from TV commercials in a practical way. They exhibit the greatest degree of insistence that the advertised product be purchased. EMR children, in contrast, use the messages learned from TV ads least insistently in regard to product purchase.

One hallmark of the regulation of commercial activity in this society has been a special concern for the "vulnerable," those who are least able to negotiate the many hazards of the marketplace. The research reported here suggests that the most vulnerable components of the sample--the young, by virtue of inexperience and the EMR by virtue of their impediments--are not more easily implanted with commercial information than their gifted counterparts, nor are they more insistent that the advertised product be purchased. Rather, it seems that the most intelligent children, those best able to process information in what might be called a prudent, sophisticated fashion, not only learn more from TV commercials, but use this knowledge more extensively in attempts to influence the purchase behavior of parents.

The Louisville and Philadelphia experiments are based on the proposition that TV commercial techniques help viewers learn to learn. However, do TV ads help children learn to learn? This study indicates they help them learn a product name and remember the ad itself. However, it has not been demonstrated that TV ads help children learn to learn. Advertisers should not confuse techniques which facilitate learning, such as the six techniques that Sesame Street has apparently borrowed from TV ads, and learning itself. What that program has done is to demonstrate the effectiveness of certain attention-getting techniques in facilitating the learning of information or concepts by children--techniques also used in TV ads. The profound difference between it and TV ads lies in the nature of what is being taught. The program is teaching "important" material (such as the ABC's) which can be built upon later and which has something to do with making children "ready" for school and its academic environment. Commercials are teaching something which may be perceived as having little or no value, except to the companies involved. No problems which require solution are posed; no reasoning or thinking is involved. While the techniques of TV ads facilitate learning (of something), it is seriously questioned whether TV ads, given their substance, help children to learn per se.

Are some techniques, including the four suggested by Wells (1965, p. 2), more facilitating than others? Trum (1971) used a form of content analysis to correlate content of TV ads with interest, and the Marplan organization used factor analysis in correlating content of commercials with memory in an unpublished series of findings in the 1950's (Hendon, 1973b, p. 41), but this was not done here. The question lends itself to future research.

Concerning the simplicity of ads and repetition, it could be argued

that if the level of advertising content is so low that it "insults the intelligence of the average child," then it is wasteful. Furthermore, it could be argued that if ads are too simple and unstimulating, normal children would have showed lower recall and DI than EMRs and that gifteds should have showed lower recall and DI than normals. It could also be argued that if ads are too simple and unstimulating, they should be processed equally by all three groups; if so, the "lowest common denominator," EMRs, has been reached, and waste would occur for both the normals and gifteds, based upon their relatively larger capacities to process information. All of these mutually exclusive alternatives invite controversy. Such value judgments should not be drawn from this study, just as it would be unwise to infer that TV ads should be applauded because they help children learn to learn, which was not proven in the present study. Even if this were to be the case, social critics of advertising would not be silenced, for they have charged TV teaches children the <u>wrong things too well</u>.

An alternative explanation may apply which would affect this implication. That EMRs may have been measured before they had caught on to the task (at which point a statistical difference between retardeds and normals is expected) may have been the case. Unless one begins at "zero" and measures S's after each series of exposures, one cannot demonstrate that the message is too simple. The same results could be obtained with a sophisticated message to which the children had been exposed a maximum number of times. Therefore, the alternative explanation is "overkill" in the sense of visual and auditory bombardment of children by primarily rote messages distributed over days and over time within those days. There are at least two interacting variables--complexity of message and practice--both of which must be manipu-

Table 2

ANOVA - Recall Scores

Summary of Significant Main Effects:

Variable	df	F-ratio	P ≤
Age	6	3.01	.01
Sex	1	1.47	non-significant
Intelligence	2	12.43	.01

Multiple Classification Analysis - Grand Mean of Recall Score = 6.410:

Variable	Category	n	Category Mean*
Age	7	17	5.786
	8	29	6.527
	9	17	5.499
	10	40	6.511
	11	44	6.516
	12	27	6.980
	13	4	6.062
Intelligence	EMR	53	5.76
	Normal	71	6.378
	Gifted	54	7.089

*Adjusted for the effects of the other independent variables.

Table 3

ANOVA - Degree of Insistence

Summary of Significant Main Effects:

Variable	df	F-ratio	P ≤
Age	6	.257	non-significant
Sex	1	.006	non-significant
Intelligence	2	3.759	.05

Multiple Classification Analysis - Grand Mean of "Insistence" = 2.955:

Variable	Category	n	Category Mean*
Intelligence	EMR	53	2.617
	Normal	71	2.885
	Gifted	54	3.195

*Adjusted for the effects of the other independent variables.

Table 4

Canonical Analysis - Children's Characteristics with Outcomes

Group	Root	Canonical Correlation	Wilks' λ	Chi Square	Significance p<	Coefficients for the Canonical Variables: Characteristics			Outcomes	
						Intell.	Age	Sex	Recall	Insistence
All Children	1	.442	.801	38.83	.01	.902	.318	.196	.873	.415
EMR	*									
Normal	1	.360	.869	9.58	.05	N/A	.952	-.300	.737	.724
Gifted	*									

*No canonical correlation significant at the α=.05 level could be found for the EMR and gifted subgroups. This was true in the case of the EMR children even when actual IQ scores (which were available for all EMR subjects) were included in the group of characteristics variables. Of course, the categorial intelligence value is not available in the other three canonical analysis of subgroups, since for any subgroup this variable does not exhibit any variation.

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